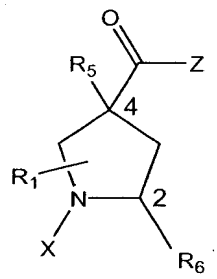
What is Claimed Is:

1. A compound having the formula



(1)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R_1 represents an H, or a functional group, and can be attached to the molecule at positions 2, 3 or 5;

R_2 represents an H or a functional group;

R_5 represents N_3 or NR_2Y;

R_6 represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at positions 2 and 4 and of the carbon bearing R_1 (if R_1 is not H) can be any one of (S,S,S), (S,S,R), (S,R,S), (S,R,R), (R,S,S), (R,S,R), (R,R,S) or (R,R,R).

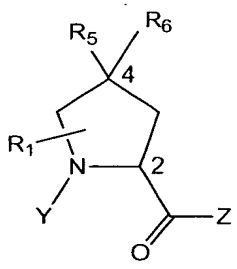
2. The compound of Claim 1, wherein R_5 is N_3.
3. The compound of Claim 1, wherein R_5 is NR_2Y.
4. The compound of Claim 1, wherein Z is OMe.
5. The compound of Claim 1, wherein X is benzylcarbamate.
6. The compound of Claim 1, wherein Y is 2-nitrobenzenesulfonamide.
7. The compound of Claim 1, wherein Y is 9-fluoroenylmethylcarbamate.
8. The compound of Claim 1, wherein X is benzylcarbamate, R_5 is NR_2Y, R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is –OMe, and R_6 is a carboxylic acid.
9. The compound of Claim 1, wherein R_1 is an alkene.

10. The compound of Claim 1, wherein R_1 is a protected carboxylate.

11. The compound of Claim 1, wherein R_1 is a protected alcohol.

12. The compound of Claim 1, wherein R_1 is a protected thiol.

13. A compound having the formula



(2)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R_1 represents an H, or a functional group, and can be attached to the molecule at positions 2, 3 or 5;

R_2 represents an H or a functional group;

R_5 represents N_3 or NR_2X;

R_6 represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at positions 2 and 4 and of the carbon bearing R_1 (if R_1 is not H) can be any one of (S,S,S), (S,S,R), (S,R,S), (S,R,R), (R,S,S), (R,S,R), (R,R,S) or (R,R,R).

14. The compound of Claim 13, wherein R_5 is N_3.

15. The compound of Claim 13, wherein R_5 is NR_2X.

16. The compound of Claim 13, wherein Z is OMe.

17. The compound of Claim 13, wherein X is benzylcarbamate.

18. The compound of Claim 13, wherein Y is 2-nitrobenzenesulfonamide.

19. The compound of Claim 13, wherein Y is 9-fluoroenylmethylcarbamate.

20. The compound of Claim 13, wherein X is benzylcarbamate, R_5 is NR_2X, R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is –OMe, and R_6 is a carboxylic acid.

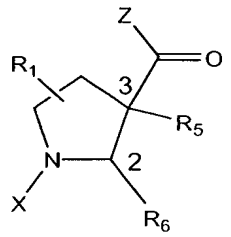
21. The compound of Claim 13, wherein R_1 is an alkene.

22. The compound of Claim 13, wherein R_1 is a protected carboxylate.

23. The compound of Claim 13, wherein R_1 is a protected alcohol.

24. The compound of Claim 13, wherein R_1 is a protected thiol.

25. A compound having the formula



(3)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R_1 represents an H, or a functional group, and can be attached to the molecule at positions 2, 4 or 5;

R_2 represents an H or a functional group;

R_5 represents N_3 or NR_2Y;

R_6 represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at positions 2 and 3 and of the carbon bearing R_1 (if R_1 is not H) can be any one of (S,S,S), (S,S,R), (S,R,S), (S,R,R), (R,S,S), (R,S,R), (R,R,S) or (R,R,R).

26. The compound of Claim 25, wherein R_5 is N_3.

27. The compound of Claim 25, wherein R_5 is NR_2Y.

28. The compound of Claim 25, wherein Z is OMe.

29. The compound of Claim 25, wherein X is benzylcarbamate.

30. The compound of Claim 25, wherein Y is 2-nitrobenzenesulfonamide.

31. The compound of Claim 25, wherein Y is 9-fluoroenylmethylcarbamate.

32. The compound of Claim 25, wherein X is benzylcarbamate, R_5 is NR_2Y, R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is –OMe, and R_6 is a carboxylic acid.

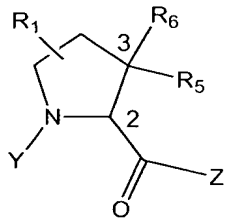
33. The compound of Claim 25, wherein R_1 is an alkene.

34. The compound of Claim 25, wherein R_1 is a protected carboxylate.

35. The compound of Claim 25, wherein R_1 is a protected alcohol.

36. The compound of Claim 25, wherein R_1 is a protected thiol.

37. A compound having the formula



(4)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R_1 represents an H, or a functional group, and can be attached to the molecule at positions 2, 4 or 5;

R_2 represents an H or a functional group;

R_5 represents N_3 or NR_2X;

R_6 represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at positions 2 and 3 and of the carbon bearing R_1 (if R_1 is not H) can be any one of (S,S,S), (S,S,R), (S,R,S), (S,R,R), (R,S,S), (R,S,R), (R,R,S) or (R,R,R).

38. The compound of Claim 37, wherein R_5 is N_3.

39. The compound of Claim 37, wherein R_5 is NR_2X.

40. The compound of Claim 37, wherein Z is OMe.

41. The compound of Claim 37, wherein X is benzylcarbamate.

42. The compound of Claim 37, wherein Y is 2-nitrobenzenesulfonamide.

43. The compound of Claim 37, wherein Y is 9-fluoroenylmethylcarbamate.

44. The compound of Claim 37, wherein X is benzylcarbamate, R_5 is NR_2X, R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is –OMe, and R_6 is a carboxylic acid.

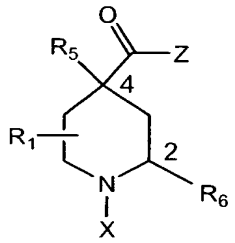
45. The compound of Claim 37, wherein R_1 is an alkene.

46. The compound of Claim 37, wherein R_1 is a protected carboxylate.

47. The compound of Claim 37, wherein R_1 is a protected alcohol.

48. The compound of Claim 37, wherein R_1 is a protected thiol.

49. A compound having the formula



(5)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R_1 represents an H, or a functional group, and can be attached to the molecule at positions 2, 3, 5 or 6;

R_2 represents an H or a functional group;

R_5 represents N_3 or NR_2Y;

R_6 represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at positions 2 and 4 and of the carbon bearing R_1 (if R_1 is not H) can be any one of (S,S,S), (S,S,R), (S,R,S), (S,R,R), (R,S,S), (R,S,R), (R,R,S) or (R,R,R).

50. The compound of Claim 49, wherein R_5 is N_3.

51. The compound of Claim 49, wherein R_5 is NR_2Y.

52. The compound of Claim 49, wherein Z is OMe.

53. The compound of Claim 49, wherein X is benzylcarbamate.

54. The compound of Claim 49, wherein Y is 2-nitrobenzenesulfonamide.

55. The compound of Claim 49, wherein Y is 9-fluoroenylmethylcarbamate.

56. The compound of Claim 49, wherein X is benzylcarbamate, R_5 is NR_2Y, R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is –OMe, and R_6 is a carboxylic acid.

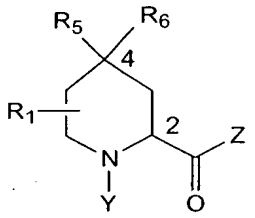
57. The compound of Claim 49, wherein R_1 is an alkene.

58. The compound of Claim 49, wherein R_1 is a protected carboxylate.

59. The compound of Claim 49, wherein R_1 is a protected alcohol.

60. The compound of Claim 49, wherein R_1 is a protected thiol.

61. A compound having the formula



(6)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R_1 represents an H, or a functional group, and can be attached to the molecule at positions 2, 3, 5 or 6;

R_2 represents an H or a functional group;

R_5 represents N_3 or NR_2X;

R_6 represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at positions 2 and 4 and of the carbon bearing R_1 (if R_1 is not H) can be any one of (S,S,S), (S,S,R), (S,R,S), (S,R,R), (R,S,S), (R,S,R), (R,R,S) or (R,R,R).

62. The compound of Claim 61, wherein R_5 is N_3.

63. The compound of Claim 61, wherein R_5 is NR_2X.

64. The compound of Claim 61, wherein Z is OMe.

65. The compound of Claim 61, wherein X is benzylcarbamate.

66. The compound of Claim 61, wherein Y is 2-nitrobenzenesulfonamide.

67. The compound of Claim 61, wherein Y is 9-fluoroenylmethylcarbamate.

68. The compound of Claim 61, wherein X is benzylcarbamate, R_5 is NR_2X, R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is –OMe, and R_6 is a carboxylic acid.

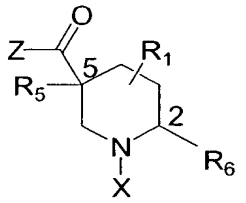
69. The compound of Claim 61, wherein R_1 is an alkene.

70. The compound of Claim 61, wherein R_1 is a protected carboxylate.

71. The compound of Claim 61, wherein R_1 is a protected alcohol.

72. The compound of Claim 61, wherein R_1 is a protected thiol.

73. A compound having the formula



(7)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R_1 represents an H, or a functional group, and can be attached to the molecule at positions 2, 3, 4 or 6;

R_2 represents an H or a functional group;

R_5 represents N_3 or NR_2Y;

R_6 represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at positions 2 and 5 and of the carbon bearing R_1 (if R_1 is not H) can be any one of (S,S,S), (S,S,R), (S,R,S), (S,R,R), (R,S,S), (R,S,R), (R,R,S) or (R,R,R).

74. The compound of Claim 73, wherein R_5 is N_3.

75. The compound of Claim 73, wherein R_5 is NR_2Y.

76. The compound of Claim 73, wherein Z is OMe.

77. The compound of Claim 73, wherein X is benzylcarbamate.

78. The compound of Claim 73, wherein Y is 2-nitrobenzenesulfonamide.

79. The compound of Claim 73, wherein Y is 9-fluoroenylmethylcarbamate.

80. The compound of Claim 73, wherein X is benzylcarbamate, R_5 is NR_2Y, R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is –OMe, and R_6 is a carboxylic acid.

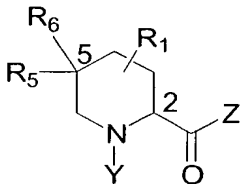
81. The compound of Claim 73, wherein R_1 is an alkene.

82. The compound of Claim 73, wherein R_1 is a protected carboxylate.

83. The compound of Claim 73, wherein R_1 is a protected alcohol.

84. The compound of Claim 73, wherein R_1 is a protected thiol.

85. A compound having the formula



(8)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R_1 represents an H, or a functional group, and can be attached to the molecule at positions 2, 3, 5 or 6;

R_2 represents an H or a functional group;

R_5 represents N_3 or NR_2X;

R_6 represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at positions 2 and 5 and of the carbon bearing R_1 (if R_1 is not H) can be any one of (S,S,S), (S,S,R), (S,R,S), (S,R,R), (R,S,S), (R,S,R), (R,R,S) or (R,R,R).

86. The compound of Claim 85, wherein R_5 is N_3.

87. The compound of Claim 85, wherein R_5 is NR_2X.

88. The compound of Claim 85, wherein Z is OMe.

89. The compound of Claim 85, wherein X is benzylcarbamate.

90. The compound of Claim 85, wherein Y is 2-nitrobenzenesulfonamide.

91. The compound of Claim 85, wherein Y is 9-fluoroenylmethylcarbamate.

92. The compound of Claim 85, wherein X is benzylcarbamate, R_5 is NR_2X, R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is –OMe, and R_6 is a carboxylic acid.

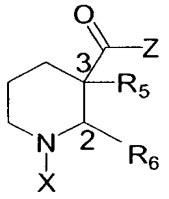
93. The compound of Claim 85, wherein R_1 is an alkene.

94. The compound of Claim 85, wherein R_1 is a protected carboxylate.

95. The compound of Claim 85, wherein R_1 is a protected alcohol.

96. The compound of Claim 85, wherein R_1 is a protected thiol.

97. A compound having the formula



(9)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R_1 represents an H, or a functional group, and can be attached to the molecule at positions 2, 4, 5 or 6;

R_2 represents an H or a functional group;

R_5 represents N_3 or NR_2Y;

R_6 represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at positions 2 and 3 and of the carbon bearing R_1 (if R_1 is not H) can be any one of (S,S,S), (S,S,R), (S,R,S), (S,R,R), (R,S,S), (R,S,R), (R,R,S) or (R,R,R).

98. The compound of Claim 97, wherein R_5 is N_3.

99. The compound of Claim 97, wherein R_5 is NR_2Y.

100. The compound of Claim 97, wherein Z is OMe.

101. The compound of Claim 97, wherein X is benzylcarbamate.

102. The compound of Claim 97, wherein Y is 2-nitrobenzenesulfonamide.

103. The compound of Claim 97, wherein Y is 9-fluoroenylmethylcarbamate.

104. The compound of Claim 97, wherein X is benzylcarbamate, R_5 is NR_2Y, R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is –OMe, and R_6 is a carboxylic acid.

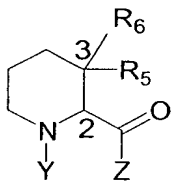
105. The compound of Claim 97, wherein R_1 is an alkene.

106. The compound of Claim 97, wherein R_1 is a protected carboxylate.

107. The compound of Claim 97, wherein R_1 is a protected alcohol.

108. The compound of Claim 97, wherein R_1 is a protected thiol.

109. A compound having the formula



(10)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R_1 represents an H, or a functional group, and can be attached to the molecule at positions 2, 4, 5 or 6;

R_2 represents an H or a functional group;

R_5 represents N_3 or NR_2X;

R_6 represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at positions 2 and 3 and of the carbon bearing R_1 (if R_1 is not H) can be any one of (S,S,S), (S,S,R), (S,R,S), (S,R,R), (R,S,S), (R,S,R), (R,R,S) or (R,R,R).

110. The compound of Claim 109, wherein R_5 is N_3.

111. The compound of Claim 109, wherein R_5 is NR_2X.

112. The compound of Claim 109, wherein Z is OMe.

113. The compound of Claim 109, wherein X is benzylcarbamate.

114. The compound of Claim 109, wherein Y is 2-nitrobenzenesulfonamide.

115. The compound of Claim 109, wherein Y is 9-fluoroenylmethylcarbamate.

116. The compound of Claim 109, wherein X is benzylcarbamate, R_5 is NR_2X, R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is –OMe, and R_6 is a carboxylic acid.

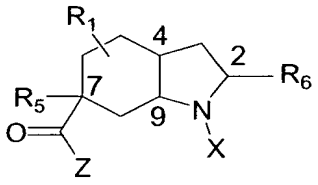
117. The compound of Claim 109, wherein R_1 is an alkene.

118. The compound of Claim 109, wherein R_1 is a protected carboxylate.

119. The compound of Claim 109, wherein R_1 is a protected alcohol.

120. The compound of Claim 109, wherein R_1 is a protected thiol.

121. A compound having the formula



(11)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R_1 represents an H, or a functional group, and can be attached to the molecule at positions 2, 3, 4, 5, 6, 8 or 9;

R_2 represents an H or a functional group;

R_5 represents N_3 or NR_2Y;

R_6 represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at positions 2, 4, 7, 9 and of the carbon bearing R_1 (if R_1 is not H) can be any of the 32 combinations of (R) and (S).

122. The compound of Claim 121, wherein R_5 is N_3.

123. The compound of Claim 121, wherein R_5 is NR_2Y.

124. The compound of Claim 121, wherein Z is OMe.

125. The compound of Claim 121, wherein X is benzylcarbamate.

126. The compound of Claim 121, wherein Y is 2-nitrobenzenesulfonamide.

127. The compound of Claim 121, wherein Y is 9-fluoroenylmethylcarbamate.

128. The compound of Claim 121, wherein X is benzylcarbamate, R_5 is NR_2Y, R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is –OMe, and R_6 is a carboxylic acid.

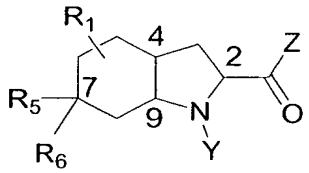
129. The compound of Claim 121, wherein R_1 is an alkene.

130. The compound of Claim 121, wherein R_1 is a protected carboxylate.

131. The compound of Claim 121, wherein R_1 is a protected alcohol.

132. The compound of Claim 121, wherein R_1 is a protected thiol.

133. A compound having the formula



(12)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R_1 represents an H, or a functional group, and can be attached to the molecule at positions 2, 3, 4, 5, 6, 8 or 9;

R_2 represents an H or a functional group;

R_5 represents N_3 or NR_2X;

R_6 represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at positions 2, 4, 7, 9 and of the carbon bearing R_1 (if R_1 is not H) can be any of the 32 combinations of (R) and (S).

134. The compound of Claim 133, wherein R_5 is N_3.

135. The compound of Claim 133, wherein R_5 is NR_2X.

136. The compound of Claim 133, wherein Z is OMe.

137. The compound of Claim 133, wherein X is benzylcarbamate.

138. The compound of Claim 133, wherein Y is 2-nitrobenzenesulfonamide.

139. The compound of Claim 133, wherein Y is 9-fluoroenylmethylcarbamate.

140. The compound of Claim 133, wherein X is benzylcarbamate, R_5 is NR_2X, R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is –OMe, and R_6 is a carboxylic acid.

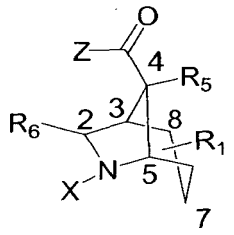
141. The compound of Claim 133, wherein R_1 is an alkene.

142. The compound of Claim 133, wherein R_1 is a protected carboxylate.

143. The compound of Claim 133, wherein R_1 is a protected alcohol.

144. The compound of Claim 133, wherein R_1 is a protected thiol.

145. A compound having the formula



(13)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R_1 represents an H, or a functional group, and can be attached to the molecule at positions 2, 3, 5, 6, 7 or 8;

R_2 represents an H or a functional group;

R_5 represents N_3 or NR_2Y;

R_6 represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at the positions 2, 3, 4 and 5, and of the carbon bearing R_1 (if R_1 is not H) can be any of the 32 combinations of (R) and (S).

146. The compound of Claim 145, wherein R_5 is N_3.

147. The compound of Claim 145, wherein R_5 is NR_2Y.

148. The compound of Claim 145, wherein Z is OMe.

149. The compound of Claim 145, wherein X is benzylcarbamate.

150. The compound of Claim 145, wherein Y is 2-nitrobenzenesulfonamide.

151. The compound of Claim 145, wherein Y is 9-fluoroenylmethylcarbamate.

152. The compound of Claim 145, wherein X is benzylcarbamate, R_5 is NR_2Y, R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is –OMe, and R_6 is a carboxylic acid.

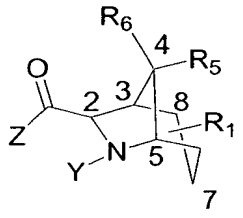
153. The compound of Claim 145, wherein R_1 is an alkene.

154. The compound of Claim 145, wherein R_1 is a protected carboxylate.

155. The compound of Claim 145, wherein R_1 is a protected alcohol.

156. The compound of Claim 145, wherein R_1 is a protected thiol.

157. A compound having the formula



(14)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R_1 represents an H, or a functional group, and can be attached to the molecule at positions 2, 3, 5, 6, 7 or 8;

R_2 represents an H or a functional group;

R_5 represents N_3 or NR_2X;

R_6 represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at the positions 2, 3, 4 and 5, and of the carbon bearing R_1 (if R_1 is not H) can be any of the 32 combinations of (R) and (S).

158. The compound of Claim 157, wherein R_5 is N_3.

159. The compound of Claim 157, wherein R_5 is NR_2X.

160. The compound of Claim 157, wherein Z is OMe.

161. The compound of Claim 157, wherein X is benzylcarbamate.

162. The compound of Claim 157, wherein Y is 2-nitrobenzenesulfonamide.

163. The compound of Claim 157, wherein Y is 9-fluoroenylmethylcarbamate.

164. The compound of Claim 157, wherein X is benzylcarbamate, R_5 is NR_2X, R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is –OMe, and R_6 is a carboxylic acid.

165. The compound of Claim 157, wherein R_1 is an alkene.

166. The compound of Claim 157, wherein R_1 is a protected carboxylate.

167. The compound of Claim 157, wherein R_1 is a protected alcohol.

168. The compound of Claim 157, wherein R_1 is a protected thiol.

169. A method of synthesizing *bis* peptides comprising the steps of:

1) providing a solid support;

2) activating a first *bis* amino acid or naturally occurring amino acid;

3) attaching the *bis* amino acid or naturally occurring amino acid to the support;

4) removing the leading edge amine protecting group if a *bis* amino acid is used, or the amine protecting group if a naturally occurring amino acid is used;

5) activating and attaching a next *bis* amino acid or a next naturally occurring amino acid to the leading edge amine of the *bis* amino acid or amine of the naturally occurring amino acid; and

6) repeating steps 4 and 5 as necessary to achieve the desired chain length;

7) detaching the synthesized *bis* peptide from the support; and

8) isolating the synthesized *bis* peptide,

where the *bis* peptide synthesized in the above manner has at least two contiguous *bis* amino acids, and a rigidification step is carried out either after step 4 or after detachment of the *bis* peptide from the solid support.

170. The method of Claim 169, further comprising the step of modifiying or adding a functional group, after step 5.

171. A method of synthesizing *bis* peptides comprising the steps of:

1) providing a *bis*-amino acid or *bis*-peptide fragment containing a mixture of *bis*-amino acid and naturally occurring amino acid with an unprotected leading edge amine and a protected trailing edge carboxylic acid;

2) providing a *bis*-s or *bis*-peptide fragment containing a mixture of *bis*-amino acid and naturally occurring amino acids with a protected leading edge amine and an activated ester;

3) coupling the two fragments in solution;

4) isolating the synthesized *bis*-peptide;

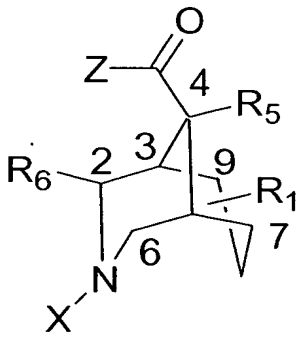
5) removing the leading edge amine protecting group or the trailing end carboxylic acid protecting group; and

6) repeating steps 1,2,3,4 to achieve the desired chain length;

where the *bis* peptide synthesized in the above manner has at least two contiguous *bis* amino acids, and a rigidification step is carried out either after step 3 or after detachment of the *bis* peptide from the solid support.

172. The method of Claim 171, further comprising the step of modifiying or adding a functional group, after step 3.

173. A compound having the formula



(15)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R_1 represents an H, or a functional group, and can be attached to the molecule at positions 2, 3, 5, 6, 7, 8 or 9;

R_2 represents an H or a functional group;

R_5 represents N_3 or NR_2Y;

R_6 represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at the positions 2, 3, 4 and 5, and of the carbon bearing R_1 (if R_1 is not H) can be any of the 32 combinations of (R) and (S).

174. The compound of Claim 173, wherein R_5 is N_3.

175. The compound of Claim 173, wherein R_5 is NR_2Y.

176. The compound of Claim 173, wherein Z is OMe.

177. The compound of Claim 173, wherein X is benzylcarbamate.

178. The compound of Claim 173, wherein Y is 2-nitrobenzenesulfonamide.

179. The compound of Claim 173, wherein Y is 9-fluoroenylmethylcarbamate.

180. The compound of Claim 173, wherein X is benzylcarbamate, R_5 is NR_2Y, R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is –OMe, and R_6 is a carboxylic acid.

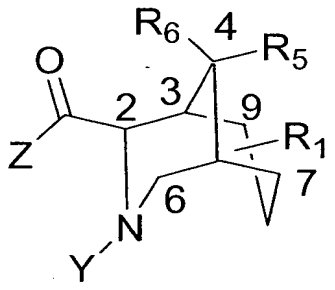
181. The compound of Claim 173, wherein R_1 is an alkene.

182. The compound of Claim 173, wherein R_1 is a protected carboxylate.

183. The compound of Claim 173, wherein R_1 is a protected alcohol.

184. The compound of Claim 173, wherein R_1 is a protected thiol.

185. A compound having the formula



(16)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R_1 represents an H, or a functional group, and can be attached to the molecule at positions 2, 3, 5, 6, 7, 8 or 9;

R_2 represents an H or a functional group;

R_5 represents N_3 or NR_2X;

R_6 represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at the positions 2, 3, 4 and 5, and of the carbon bearing R_1 (if R_1 is not H) can be any of the 32 combinations of (R) and (S).

186. The compound of Claim 185, wherein R_5 is N_3.

187. The compound of Claim 185, wherein R_5 is NR_2X.

188. The compound of Claim 185, wherein Z is OMe.

189. The compound of Claim 185, wherein X is benzylcarbamate.

190. The compound of Claim 185, wherein Y is 2-nitrobenzenesulfonamide.

191. The compound of Claim 185, wherein Y is 9-fluoroenylmethylcarbamate.

192. The compound of Claim 185, wherein X is benzylcarbamate, R_5 is NR_2X, R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is –OMe, and R_6 is a carboxylic acid.

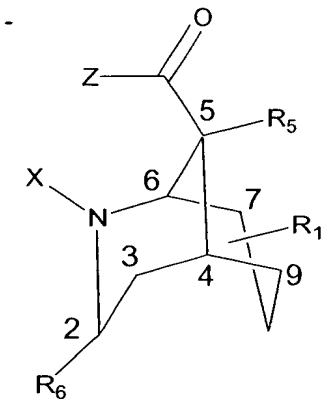
193. The compound of Claim 185, wherein R_1 is an alkene.

194. The compound of Claim 185, wherein R_1 is a protected carboxylate.

195. The compound of Claim 185, wherein R_1 is a protected alcohol.

196. The compound of Claim 185, wherein R_1 is a protected thiol.

197. A compound having the formula



(17)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R_1 represents an H, or a functional group, and can be attached to the molecule at positions 2, 3, 4, 6, 7, 8 or 9;

R_2 represents an H or a functional group;

R_5 represents N_3 or NR_2Y;

R_6 represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at the positions 2, 4, 5 and 6, and of the carbon bearing R_1 (if R_1 is not H) can be any of the 32 combinations of (R) and (S).

198. The compound of Claim 197, wherein R_5 is N_3.

199. The compound of Claim 197, wherein R_5 is NR_2Y.

200. The compound of Claim 197, wherein Z is OMe.

201. The compound of Claim 197, wherein X is benzylcarbamate.

202. The compound of Claim 197, wherein Y is 2-nitrobenzenesulfonamide.

203. The compound of Claim 197, wherein Y is 9-fluoroenylmethylcarbamate.

204. The compound of Claim 197, wherein X is benzylcarbamate, R_5 is NR_2Y, R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is –OMe, and R_6 is a carboxylic acid.

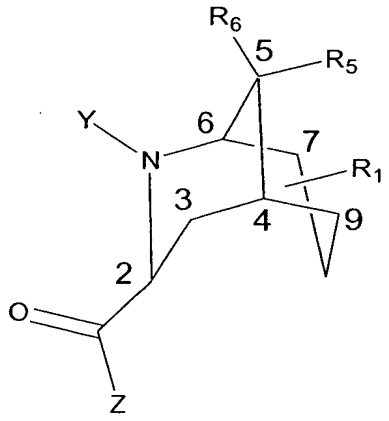
205. The compound of Claim 197, wherein R_1 is an alkene.

206. The compound of Claim 197, wherein R_1 is a protected carboxylate.

207. The compound of Claim 197, wherein R_1 is a protected alcohol.

208. The compound of Claim 197, wherein R_1 is a protected thiol.

209. A compound having the formula



(18)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R_1 represents an H, or a functional group, and can be attached to the molecule at positions 2, 3, 4, 6, 7, 8 or 9;

R_2 represents an H or a functional group;

R_5 represents N_3 or NR_2X;

R_6 represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at the positions 2, 4, 5 and 6, and of the carbon bearing R_1 (if R_1 is not H) can be any of the 32 combinations of (R) and (S).

210. The compound of Claim 209, wherein R_5 is N_3.

211. The compound of Claim 209, wherein R_5 is NR_2X.

212. The compound of Claim 209, wherein Z is OMe.

213. The compound of Claim 209, wherein X is benzylcarbamate.

214. The compound of Claim 209, wherein Y is 2-nitrobenzenesulfonamide.

215. The compound of Claim 209, wherein Y is 9-fluoroenylmethylcarbamate.

216. The compound of Claim 209, wherein X is benzylcarbamate, R_5 is NR_2X, R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is –OMe, and R_6 is a carboxylic acid.

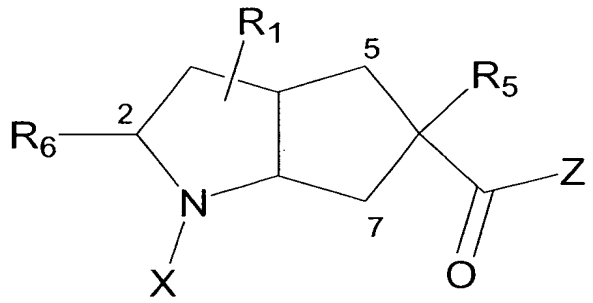
217. The compound of Claim 209, wherein R_1 is an alkene.

218. The compound of Claim 209, wherein R_1 is a protected carboxylate.

219. The compound of Claim 209, wherein R_1 is a protected alcohol.

220. The compound of Claim 209, wherein R_1 is a protected thiol.

221. A compound having the formula



(19)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R_1 represents an H, or a functional group, and can be attached to the molecule at positions 2, 3, 4, 5, 7 or 8;

R_2 represents an H or a functional group;

R_5 represents N_3 or NR_2Y;

R_6 represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at the positions 2, 4, 6 and 8, and of the carbon bearing R_1 (if R_1 is not H) can be any of the 32 combinations of (R) and (S).

222. The compound of Claim 221, wherein R_5 is N_3.

223. The compound of Claim 221, wherein R_5 is NR_2Y.

224. The compound of Claim 221, wherein Z is OMe.

225. The compound of Claim 221, wherein X is benzylcarbamate.

226. The compound of Claim 221, wherein Y is 2-nitrobenzenesulfonamide.

227. The compound of Claim 221, wherein Y is 9-fluoroenylmethylcarbamate.

228. The compound of Claim 221, wherein X is benzylcarbamate, R_5 is NR_2Y, R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is –OMe, and R_6 is a carboxylic acid.

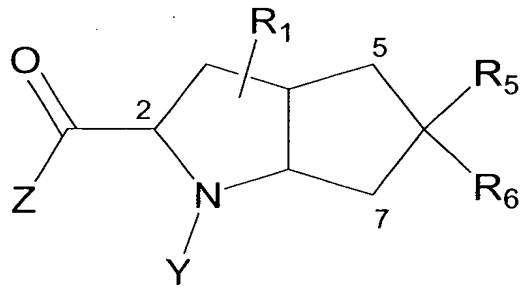
229. The compound of Claim 221, wherein R_1 is an alkene.

230. The compound of Claim 221, wherein R_1 is a protected carboxylate.

231. The compound of Claim 221, wherein R_1 is a protected alcohol.

232. The compound of Claim 221, wherein R_1 is a protected thiol.

233. A compound having the formula



(20)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R_1 represents an H, or a functional group, and can be attached to the molecule at positions 2, 3, 4, 5, 7 or 8;

R_2 represents an H or a functional group;

R_5 represents N_3 or NR_2X;

R_6 represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at the positions 2, 4, 6 and 8, and of the carbon bearing R_1 (if R_1 is not H) can be any of the 32 combinations of (R) and (S).

234. The compound of Claim 233, wherein R_5 is N_3.

235. The compound of Claim 233, wherein R_5 is NR_2X.

236. The compound of Claim 233, wherein Z is OMe.

237. The compound of Claim 233, wherein X is benzylcarbamate.

238. The compound of Claim 233, wherein Y is 2-nitrobenzenesulfonamide.

239. The compound of Claim 233, wherein Y is 9-fluoroenylmethylcarbamate.

240. The compound of Claim 233, wherein X is benzylcarbamate, R_5 is NR_2X, R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is –OMe, and R_6 is a carboxylic acid.

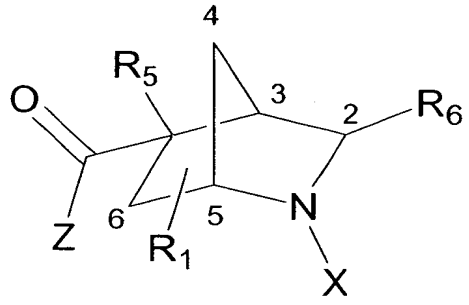
241. The compound of Claim 233, wherein R_1 is an alkene.

242. The compound of Claim 233, wherein R_1 is a protected carboxylate.

243. The compound of Claim 233, wherein R_1 is a protected alcohol.

244. The compound of Claim 233, wherein R_1 is a protected thiol.

245. A compound having the formula



(21)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R_1 represents an H, or a functional group, and can be attached to the molecule at positions 2, 3, 4, 5 or 6;

R_2 represents an H or a functional group;

R_5 represents N_3 or NR_2Y;

R_6 represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at the positions 2, 3, 5 and 7, and of the carbon bearing R_1 (if R_1 is not H) can be any of the 32 combinations of (R) and (S).

246. The compound of Claim 245, wherein R_5 is N_3.

247. The compound of Claim 245, wherein R_5 is NR_2Y.

248. The compound of Claim 245, wherein Z is OMe.

249. The compound of Claim 245, wherein X is benzylcarbamate.

250. The compound of Claim 245, wherein Y is 2-nitrobenzenesulfonamide.

251. The compound of Claim 245, wherein Y is 9-fluoroenylmethylcarbamate.

252. The compound of Claim 245, wherein X is benzylcarbamate, R_5 is NR_2Y, R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is –OMe, and R_6 is a carboxylic acid.

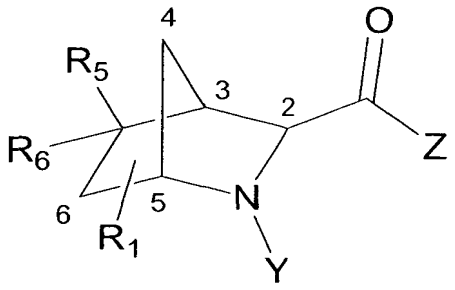
253. The compound of Claim 245, wherein R_1 is an alkene.

254. The compound of Claim 245, wherein R_1 is a protected carboxylate.

255. The compound of Claim 245, wherein R_1 is a protected alcohol.

256. The compound of Claim 245, wherein R_1 is a protected thiol.

257. A compound having the formula



(22)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R_1 represents an H, or a functional group, and can be attached to the molecule at positions 2, 3, 4, 5 or 6;

R_2 represents an H or a functional group;

R_5 represents N_3 or NR_2X;

R_6 represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at the positions 2, 3, 5 and 7, and of the carbon bearing R_1 (if R_1 is not H) can be any of the 32 combinations of (R) and (S).

258. The compound of Claim 257, wherein R_5 is N_3.

259. The compound of Claim 257, wherein R_5 is NR_2X.

260. The compound of Claim 257, wherein Z is OMe.

261. The compound of Claim 257, wherein X is benzylcarbamate.

262. The compound of Claim 257, wherein Y is 2-nitrobenzenesulfonamide.

263. The compound of Claim 257, wherein Y is 9-fluoroenylmethylcarbamate.

264. The compound of Claim 257, wherein X is benzylcarbamate, R_5 is NR_2X, R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is –OMe, and R_6 is a carboxylic acid.

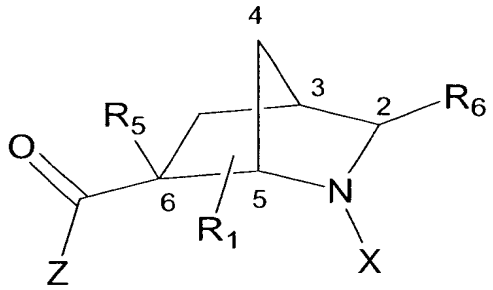
265. The compound of Claim 257, wherein R_1 is an alkene.

266. The compound of Claim 257, wherein R_1 is a protected carboxylate.

267. The compound of Claim 257, wherein R_1 is a protected alcohol.

268. The compound of Claim 257, wherein R_1 is a protected thiol.

269. A compound having the formula



(23)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R_1 represents an H, or a functional group, and can be attached to the molecule at positions 2, 3, 4, 5 or 7;

R_2 represents an H or a functional group;

R_5 represents N_3 or NR_2Y;

R_6 represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at the positions 2, 3, 5 and 6, and of the carbon bearing R_1 (if R_1 is not H) can be any of the 32 combinations of (R) and (S).

270. The compound of Claim 269, wherein R_5 is N_3.

271. The compound of Claim 269, wherein R_5 is NR_2Y.

272. The compound of Claim 269, wherein Z is OMe.

273. The compound of Claim 269, wherein X is benzylcarbamate.

274. The compound of Claim 269, wherein Y is 2-nitrobenzenesulfonamide.

275. The compound of Claim 269, wherein Y is 9-fluoroenylmethylcarbamate.

276. The compound of Claim 269, wherein X is benzylcarbamate, R_5 is NR_2Y, R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is –OMe, and R_6 is a carboxylic acid.

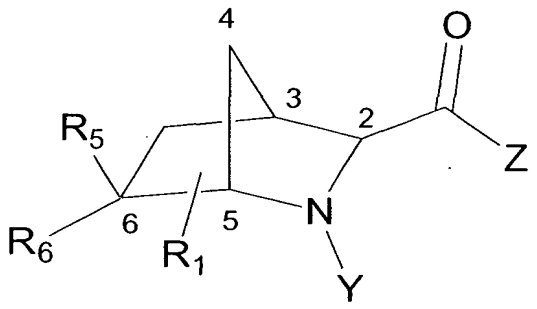
277. The compound of Claim 269, wherein R_1 is an alkene.

278. The compound of Claim 269, wherein R_1 is a protected carboxylate.

279. The compound of Claim 269, wherein R_1 is a protected alcohol.

280. The compound of Claim 269, wherein R_1 is a protected thiol.

281. A compound having the formula



(24)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R_1 represents an H, or a functional group, and can be attached to the molecule at positions 2, 3, 4, 5 or 7;

R_2 represents an H or a functional group;

R_5 represents N_3 or NR_2X;

R_6 represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at the positions 2, 3, 5 and 6, and of the carbon bearing R_1 (if R_1 is not H) can be any of the 32 combinations of (R) and (S).

282. The compound of Claim 281, wherein R_5 is N_3.

283. The compound of Claim 281, wherein R_5 is NR_2X.

284. The compound of Claim 281, wherein Z is OMe.

285. The compound of Claim 281, wherein X is benzylcarbamate.

286. The compound of Claim 281, wherein Y is 2-nitrobenzenesulfonamide.

287. The compound of Claim 281, wherein Y is 9-fluoroenylmethylcarbamate.

288. The compound of Claim 281, wherein X is benzylcarbamate, R_5 is NR_2X, R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is –OMe, and R_6 is a carboxylic acid.

289. The compound of Claim 281, wherein R_1 is an alkene.

290. The compound of Claim 281, wherein R_1 is a protected carboxylate.

291. The compound of Claim 281, wherein R_1 is a protected alcohol.

292. The compound of Claim 281, wherein R_1 is a protected thiol.

293. A synthesized *bis* peptide made by the method of Claim 169, where the number of amino acids in the peptide, whether naturally occurring or *bis* amino acids, is less than 500.

294. A synthesized *bis* peptide made by the method of Claim 171, where the number of amino acids in the peptide, whether naturally occurring or *bis* amino acids, is less than 500.